

**PORABLE STORAGE CONTAINER**  
**BACKGROUND OF THE INVENTION**

[0001] Portable storage containers that both stack and nest with similar containers are commonly used in industry for transporting and storing goods. Nesting is typically achieved when an empty container receives a like container therein such that there is some overlap between the walls and the containers. On the other hand, the stacking feature is typically used when an occupied container has a like container supported thereon, such that there is relatively little or no overlap between the walls of the containers, and the goods contained in the lower container are preferably not contacted or damaged by the upper container. Many containers use members known bail members to achieve the stacking feature. Bail members may typically be positioned out of the way for purposes of nesting, but then moved to a stacking position for allowing containers to be stacked thereon. Often, the stacks may consist of multiple containers having a load. Unfortunately, some containers may not have sufficient strength to accommodate such loads in a stack.

[0002] The bail members in some containers are movable among three positions: a nesting position, a first stack position and a second stack position. The bail members support containers in the first stack position at a first distance from the floor, or at the second stack position at a second distance from the floor.

## SUMMARY OF THE INVENTION

[0003] A container according to one embodiment of the present invention provides a nest position and three selectable heights for the support portions of the bail members. The bail members can be adjusted to support similar containers stacked thereon according to how much is in the container. Additionally, the container provides improved strength and reliability of the bail members, and prevents accidental dislodgement of the bail members from their selected positions.

[0004] The container includes a plurality of walls extending upwardly from a floor. At least one of the walls includes an inner wall portion and an outer wall portion. At least one of the inner and outer wall portions has an elongated pin opening. A pair of bail members are each movable among a nest position, an upper stack position, a middle stack position and a lower stack position. Each bail member includes a support portion and arm extending transversely from outer ends of the support portion. A pin extends transversely from an outer end of each arm. Each pin is received in one of the pin openings, with the arm received between the inner and outer wall portions. The pins are slidable and pivotable in the pin openings to move the bail members to the various positions. Because the arms of the bail members are received between the inner and outer wall portions, accidental dislodgement of the bail member pins from the pin openings is prevented.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Other advantages of the present invention can be understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

[0006] Figure 1 is a perspective view of a container according to a first embodiment of the present invention with the bail members in the nest position.

[0007] Figure 2 is a quarter sectioned perspective view of the container of Figure 1, with a similar container nested therein.

[0008] Figure 3 is a perspective view of the container of Figure 1 with the bail members in an upper stack position.

[0009] Figure 4 is an end view of half of the container of Figure 3.

[0010] Figure 5 is a quarter sectioned perspective view of the container of Figure 3, with a similar container stacked thereon.

[0011] Figure 6 is a perspective view of the container of Figure 1 with the bail members in a middle stack position.

[0012] Figure 7 is a quarter sectioned perspective view of the container of Figure 6, with a similar container stacked thereon.

[0013] Figure 8 is a perspective view of the container of Figure 1 with the bail members in a lower stack position.

[0014] Figure 9 is a quarter sectioned perspective view of the container of Figure 8, with a similar container stacked thereon.

[0015] Figure 10 is a composite interior view of an end wall of the container of Figure 1, showing the four positions of the bail members.

- [0016] Figure 11 is a top view of the container of Figure 1.
  - [0017] Figure 12 is a bottom view of the container of Figure 1.
  - [0018] Figure 13 is a side view of the container of Figure 1.
  - [0019] Figure 14 is an end view of the container of Figure 1.
  - [0020] Figure 15 is a perspective view of a container according to a second embodiment of the present invention with the bail members in the nest position.
- [0021] Figure 16 is a quarter sectioned perspective view of the container of Figure 15 with a similar container stacked thereon.
- [0022] Figure 17 is a perspective view of the container of Figure 15 with the bail members in an upper stack position.
- [0023] Figure 18 is an end view of half of the container of Figure 17 with a similar container stacked thereon.
- [0024] Figure 19 is a perspective view of the container of Figure 15 with the bail members in a lower stack position.
- [0025] Figure 20 is an end view of half of the container of Figure 19, with a similar container stacked thereon.
- [0026] Figure 21 is a composite interior view of an end wall of the container of Figure 15, showing the four positions of the bail members.
- [0027] Figure 22 is a top view of the container of Figure 15.
  - [0028] Figure 23 is a bottom view of the container of Figure 15.
  - [0029] Figure 24 is a side view of the container of Figure 15.
  - [0030] Figure 25 is an end view of the container of Figure 15.

[0031] Figure 26 is an enlarged perspective view of an optional bail cap on a pin of a bail member that could be used in either of the embodiments.

#### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS**

[0032] A container 10 according to the present invention is shown in Figure 1. The container 10 includes a floor 12 and a pair of opposed side walls 14 and a pair of opposed end walls 16. A pair of bail members 18 are each mounted to each end wall 16, such that a support portion 19 of each bail member 18 extends across the length of the container 10. The end walls 16 each include an upper wall portion that has an outer wall portion 20 spaced from an inner wall portion 22. A lower wall portion 24 is generally aligned below the inner wall portion 22, such that the outer wall portion 20 forms a ledge 25 along the end wall 16.

[0033] Elongated pin openings 30 are formed in each outer wall portion 20 to trap pins 32 at the outer ends of the bail members 18. The pins 32 are slidable and pivotable within the pin openings 30, such that the bail members 18 can be moved to a plurality of positions and orientations. In Figures 1 and 2, the bail members 18 are in the nest position, where the support portions 19 of the bail members 18 are disposed on the side walls 14 and the pins 32 are at first pivot axes in the pin openings 30. In this position, as shown in Figure 2, a similar container 10' can be nested within the container 10, with the floor 12' nested within the walls 16 of the container 10. The outer wall portion 20' of the above-nested container 10' is supported on the outer wall portion 20 of the container 10.

[0034] Figure 3 shows the bail members 18 in an upper stack position with each support portion 19 supported on a support rest 36 on the inner wall portion 22, inwardly of the side walls 14 and suspended above the floor 12 by a first height substantially equal to the height of the walls 14, 16. The support rest 36 is a notch formed in the inner wall portion 22 to impede movement of the bail member 18 out of the selected position.

[0035] Referring to Figure 4, the pin 32 is pivotable in a second pivot axis in the pin opening 30 and the bail member 18 protrudes slightly from the top of the container 10. An arm 38 of the bail member 18 between the support portion 19 and each pin 32 is received between the inner wall portion 22 and outer wall portion 20. The inner and outer wall portions 22, 20 prevent contact with the arm 38 by users or by other containers or objects, which prevents the pin 32 from being knocked out of the pin opening 30.

[0036] Figure 5 shows the container 10 with the bail member 18 in the upper stack position supporting a similar container 10', such that the floor 12' of the upper container 10' is supported by the support portion 19 of the bail member 18 of the lower container 10. This position provides the maximum storage capacity in the container 10, while keeping the weight of the upper container 10' off the container 10 contents.

[0037] Figure 6 shows the container 10 with the bail members 18 in a middle stack position on support rests 42 on the inner wall portions 22 and with the pins 32 in third pivot axes in the pin openings 30. The support rests 42 are notches formed in the inner wall portion 22 to impede movement of the bail member 18 out of the selected

position. As shown in Figure 7, the upper container 10' is supported at a middle height above the floor 12 by the bail member 18 in the middle position.

[0038] Figure 8 shows the container 10 with the bail members 18 in a lower stack position on support rests 46 on the inner wall portions 22 and with the pins 32 in fourth pivot axes at ends of the pin openings 30. The support rest 46 is a notch formed in the inner wall portion 22 to impede movement of the bail member 18 out of the selected position. As shown in Figure 9, the upper container 10' is supported at a minimal height above the floor 12 by the bail member 18 in the lower position. The support rests 46' of the upper container 10' nest within the outer wall portions 22 of the container 10.

[0039] Figure 10 is an interior composite view of an end wall 16 of the container 10, showing all four of the positions of the bail members 18 and pins 32, with the reference characters "a" through "d" appended to signify the four positions. The portion of the bail member 18 illustrated in phantom is positioned between the inner wall 22 and the outer wall 20. Bail member 18a is in the nest position with the pin 32a in the first pivot axis in the pin opening 30. In the nest position, the support portion 19 of the bail member 18 is not inwardly of the side walls 14, and thus permits nesting of a similar container in container 10.

[0040] Bail member 18b is in the upper stack position with the pin 32b in the second pivot axis in the pin opening 30. In the upper stack position, the support portion 19 of the bail member 18 is supported on support rest 36 of the inner wall 22, at a height substantially equal to the height of the walls 14, 16.

[0041] Bail member 18c is in the middle stack position with the pin 32c in the third pivot axis in the pin opening 30. In the middle stack position, the support portion

19 of the bail member 18 is supported on support rest 42 of the inner wall 22, at a middle height from the floor 12.

[0042] Bail member 18d is in the lower stack position with the pin 32d in the fourth pivot axis in the pin opening 30. In the lower stack position, the support portion 19 of the bail member 18 is supported on support rest 46 of the inner wall 22, at a minimal height from the floor 12.

[0043] Upward protrusions extend upwardly into the pin opening 30 between each of the pivot axes to inhibit unintended movement of the pin 32 between pivot axes. Further, the arm 38 of the bail member 18 is always between the inner wall portion 22 and the outer wall portion 20. This prevents accidental dislodgement of the pins 32a-d from the pin opening 30.

[0044] The container 10 provides a nest position and three selectable heights for the support portions 19 of the bail members 18. Depending on how much is stored in the container 10, the bail members 18 can be adjusted to support similar containers 10' stacked thereon without resting on the contents.

[0045] Figure 11 shows a top view of the container 10. Figure 12 shows a bottom view of the container 10. Figure 13 is a side view of the container 10. Figure 14 is an end view of the container 10.

[0046] A container 110 according to a second embodiment of the present invention is shown in Figures 15-25. Components corresponding to those in the first embodiment are given a similar reference numeral, prepended with the numeral "1." The container 110 includes side walls 114 and end walls 116 extending upwardly from a floor 112. End walls 116 include outer wall portions 120 and inner wall portions 122.

Pin openings 130 are formed in the outer wall portions 122 and receive the pins 132 of the bail members 118. An upward protrusion 134 extends into the pin opening 130.

[0047] In Figures 15 and 16, the bail members 118 are shown in the nest position, with the support portions 119 of the bail members 118 on the side walls 114 and with the pins 132 at first pivot axes in the pin openings 130. In this position, a similar container 110' can nest within the container 110 when stacked thereon, as shown in Figure 16.

[0048] In Figures 17 and 18, the bail members 118 are shown in the upper stack position with the support portions 119 of the bail members 118 supported on support rests 136. In this position, a similar container 110' is supported on the bail members 118 at a maximum height above the floor 112, as shown in Figure 18. The pins 132 are still at the first pivot axes, as the bail members 118 are pivotable about the first pivot axis between the nest position (Figures 15 and 16) and the upper stack position (Figures 17 and 18).

[0049] In Figures 19 and 20, the bail members 118 are shown in the lower stack position with the support portions 119 of the bail members 118 supported on the support rests 146. In this position, a similar container 110' is supported on the bail members 118 at a minimum height above the floor 112, as shown in Figure 20, and the upper container 110' partially nests within the container 110 without putting weight on the contents of the container 110.

[0050] Figure 21 is an interior composite view of an end wall 116 of the container 110, showing all three of the positions of the bail members 118 and pins 132, with the reference characters "a" through "c" appended to signify the three positions.

Bail member 118a is in the nest position with the pin 132a in the first pivot axis in the pin opening 130. In the nest position, the support portion 119 of the bail member 118a is not inwardly of the side walls 114, and thus permits nesting of a similar container in container 110.

[0051] Bail member 118b is in the upper stack position with the pin 132b in the first pivot axis in the pin opening 130. In the upper stack position, the support portion 119 of the bail member 118b is supported on support rest 136 of the inner wall 122, at a height substantially equal to the height of the walls 114, 116.

[0052] Bail member 118c is in the lower stack position with the pin 132c in the second pivot axis in the pin opening 130. In the lower stack position, the support portion 119 of the bail member 118c is supported on support rest 146 of the inner wall 122, at a minimal height from the floor 112. The upward protrusion 134 extends upwardly into the pin opening 130 between the pivot axes to inhibit unintended movement of the pin 132 between pivot axes.

[0053] Figure 22 shows a top view of the container 110. Figure 23 shows a bottom view of the container 110. Figure 24 is a side view of the container 110. Figure 25 is an end view of the container 110.

[0054] Figure 26 is an enlarged perspective view showing an optional bail cap 55 which could be used on a pin 32 of a bail member 18 in either of the embodiments. The bail cap 55 has an enlarged portion 57 with a diameter larger than a dimension of an opening 59 in the wall 61. The bail cap 55 is fitted onto the pin 32 after the pin 32 is inserted through the opening 59 in the wall. Because the bail cap 55 has a larger diameter than the dimension of the opening 59, the bail cap 55 prevents the pin 32 from becoming

dislodged from the opening 59. The bail cap 55 also helps keep the bail member 18 in alignment, especially when the bail member 18 is moved between positions.

**[0055]** In both embodiments, the walls and floor of the container 10, 110 are integrally molded as a single unitary structure from a plastic material such as polypropylene, but other suitable materials could also be used. The bail members 18, 118 are preferably steel, but could also be glass-filled nylon or other composite material.

**[0056]** While embodiments of the invention have been illustrated and described, it is not intended that these embodiments illustrate and describe all possible forms of the invention. Rather, the words used in the specification are words of description rather than limitation, and it is understood that various changes may be made without departing from the spirit and scope of the invention. There are different designs of containers that would benefit from the present invention.